DOE -EM SNF TRANSPORTATION SYSTEM

System Objective:

Devise an optimized system that will safely transport all spent nuclear fuel types in DOE-EM's inventory.

Program Drivers

- Nuclear Waste Policy Act of 1982 (as amended)

  Defines DOE responsibilities for taking custody of, transportation, and disposition of vitrified high-level waste and spent nuclear fuel.

- EM - RW Memorandum of Agreement

  Defines organizational responsibilities for the transportation of vitrified high level waste and spent nuclear fuel.

Program Strategy

- Develop system concept (completed)
- Build Consensus with customers (cont'd.)
- Develop design specifications (draft done)
- Design and licensing (2002 - 2005)
- Fabrication (2006 - 2010)
- System tests and training (2008 - 2010)

Controlling Requirements and Standards

- Nuclear Regulatory Commission (10CFR71)
- US Department of Transportation (49CFR173)
- National Standards (ANSI,ASME, ASTM)
- State and ICC Regulations
- Stakeholder Requirements
- Other Regulations/Requirements (IAEA)
- Regulatory Documents (NUREGs, Reg. Guides)

Design Bases

Regulatory Criteria

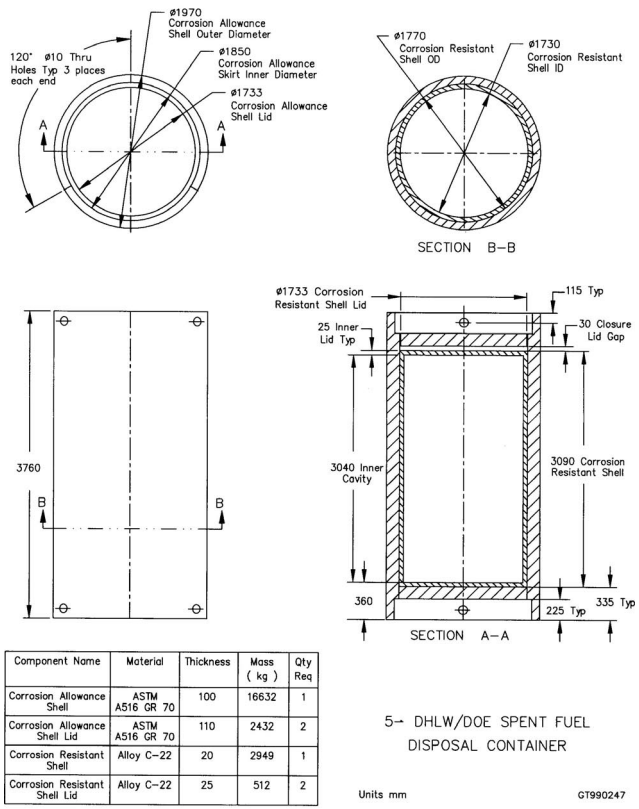
- Nuclear RegulatoryCommission (10CFR71)
  NUREG 1617 and Reg. Guide Series 7
- US Department of Transportation (49CFR173)

Payload Criteria

- Repository 5 - pack internal dimensions
- Railway transportation criteria
- Unrestricted interchange transport dimensions

Repository 5-Pack Concept

- Internal dimensions of SNF long disposal container:
  - 4.617 m. (181.8 in.) deep
  - 1.757 m. (69.2 in.) diameter



Component Name	Material	Thickness	Mass (kg)	Qty Req
Corrosion Allowance Shell	ASTM A516 GR 70	100	16632	1
Corrosion Allowance Shell Lid	ASTM A516 GR 70	110	2432	2
Corrosion Resistant Shell	Alloy C–22	20	2949	1
Corrosion Resistant Shell Lid	Alloy C–22	25	512	2

5→ DHLW/DOE SPENT FUEL
DISPOSAL CONTAINER

Units mm

GT990247

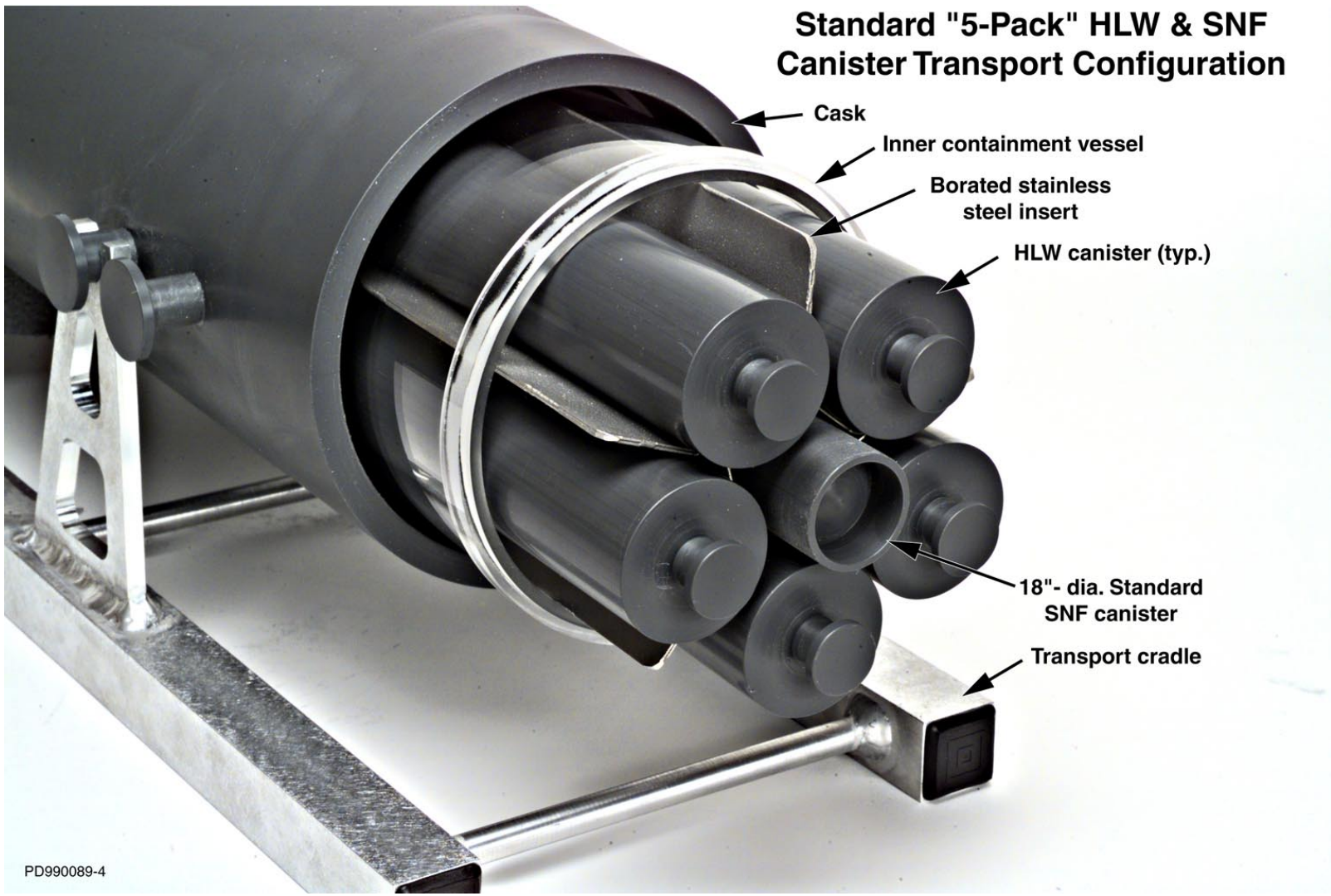
Design Criteria

- Normal Conditions of Transport (10CFR71.71)
- Accident Conditions of Transport (10CFR71.73)
- Containment (10CFR71.51 & NUREG 1617 Section 4)
- Requirement for damaged SNF (10CFR71.63)
- Shielding (49 CFR 173.441 & 10 CFR 71.47(b))
- Criticality Control (NUREG 1617 Section 6)

Design Objectives

- Maximum flexibility for all DOE-EM SNF
- Maximum payload capacity within limitations
- Simplified reconfiguration between load types
- Minimum transportation restrictions
- Minimum radiation exposure (ALARA)

Reconfiguration Between Loads



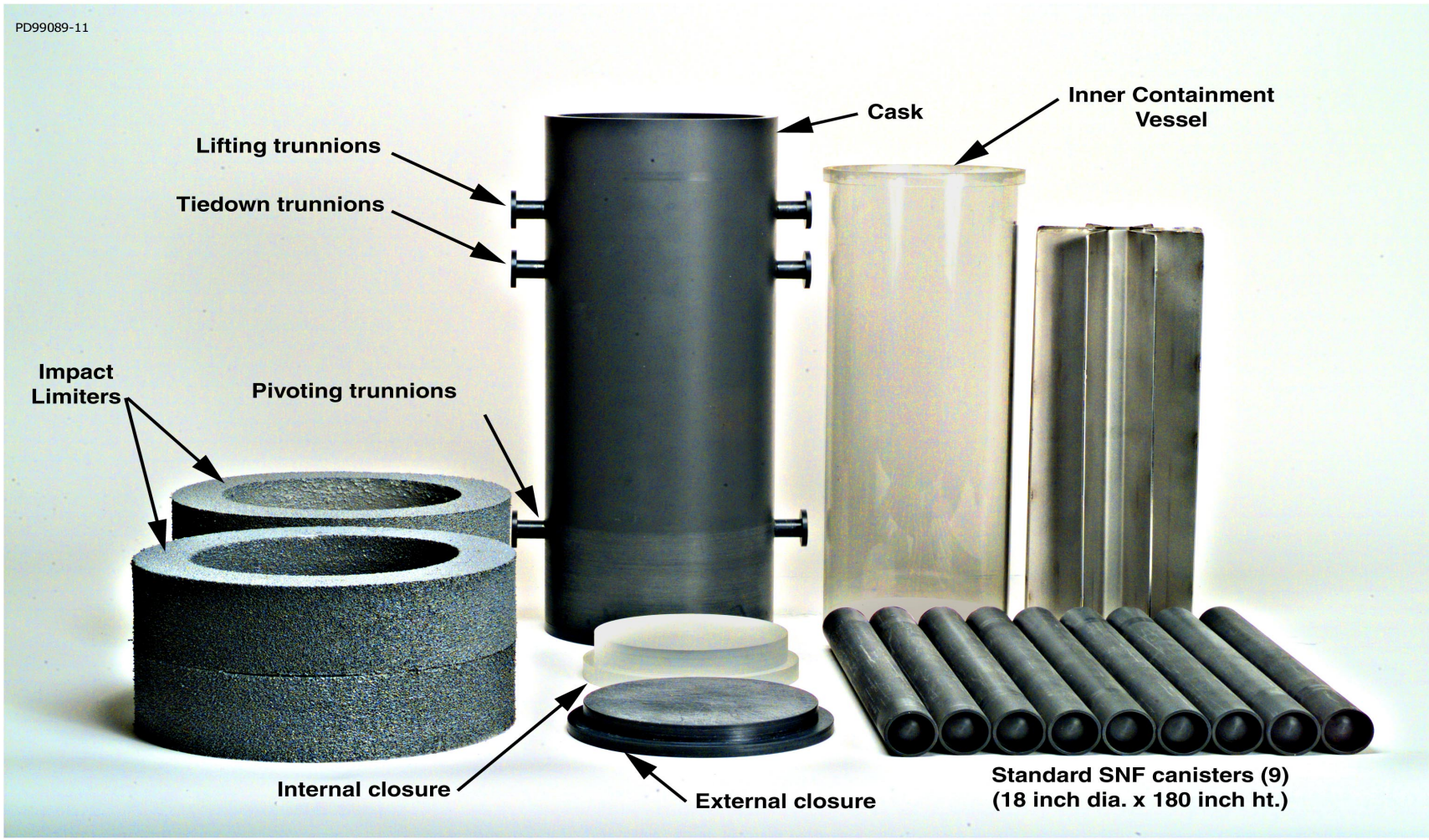
General Specifications

- **Cylindrical, lead or depleted uranium shielded, stainless steel assembly designed and built to ASME Section III Division 3 requirements;**
- **Providing two levels of containment, each with closures featuring bore seals and leak testable to ANSI 14.5;**
- **Equipped with top and bottom impact limiters; lifting, tie-down, and pivoting trunnions; interchangeable baskets;**
- **Intended primarily for rail transport via FM class, double articulated, eight-axle flat cars.**

Significant Features

- Two independently testable containments in accordance with 10CFR71.63 for damaged fuels.
- Secondary containment is removable when not needed to provide increased payload capacity.
- Removable and interchangeable internal baskets to maximize flexibility.

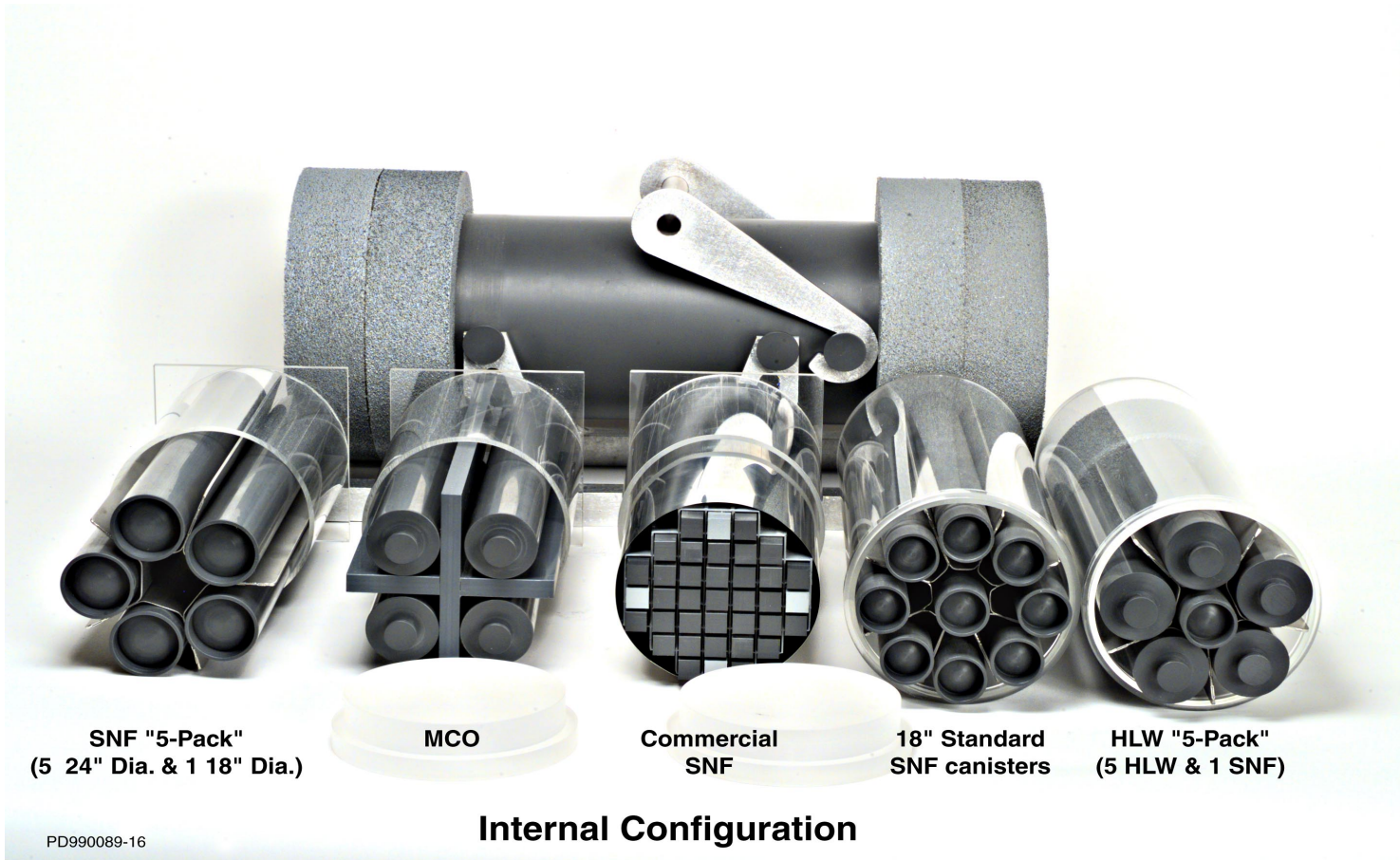
Key Components



Detailed Specifications

- **External Dimensions: 217.9 in. x 85.87 in.**
- **Estimated maximum shipping weight: 200 tons**
  - **In transit and includes impact limiters and transport cradle**
- **Estimated maximum handling weight: 154 tons**
  - **The max. weight is contents and configuration dependent**
- **Shielding: Lead or Depleted Uranium**
  - **Estimated thickness: 4.25 in. for lead, 3.5 in. for D.U.**
- **Internal (payload) cavity:**
  - **With secondary containment: 181.3 in. x 68.78 in.**
  - **Without secondary containment: 188.2 in. x 73.71 in.**
- **Criticality Control: Borated or Gadolinium stainless steel**

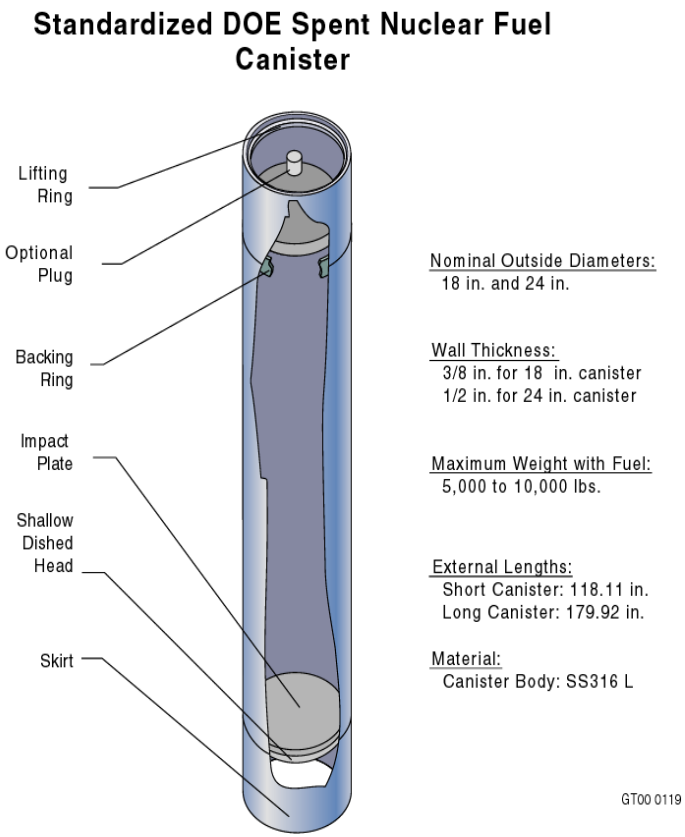
Transportation System Configurations



Standardized DOE SNF Canister

- An integral component of the packaging system
- Designed to:
  - Serve as a container during storage and shipment
  - Confine damaged fuels
  - Facilitate handling of large numbers of fuel assemblies
  - Withstand handling accidents
- An integral component of the waste disposal system

Standardized DOE SNF Canister



- Developed to be single package used by DOE Complex
- Robust performance
- Maintains containment under accident conditions
  - New canister testing completed
  - Future aged/degraded canister testing
- Full scale testing and validation of analytical models
- Compatible with storage, transportation and disposal plans

CONCLUSION

The National Spent Nuclear Fuel Program contends that the system described in this presentation is capable of safely transporting all spent nuclear fuels in DOE-EM's inventory with the highest achievable efficiency and in compliance with the applicable regulations, standards, and codes and with the Nuclear Waste Policy Act of 1982.

View of the Future